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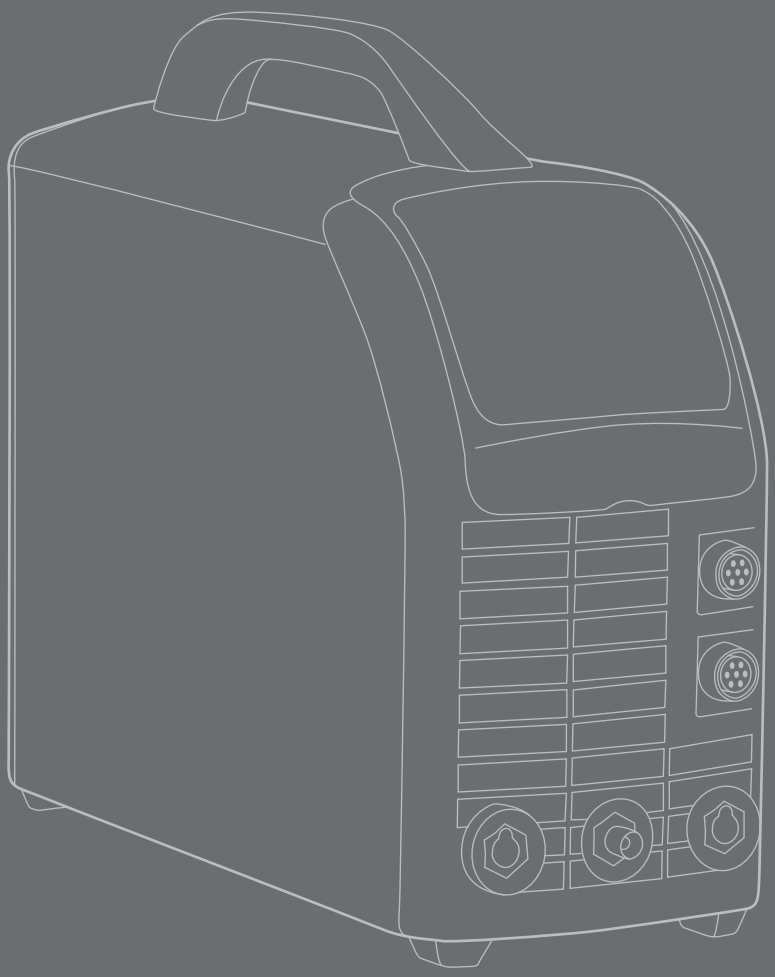
MasterTig

LT 250



KEMPPI

OPERATING MANUAL

English

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1. PREFACE

1.1 General

Congratulations on choosing the MasterTig LT 250 equipment. Used correctly, Kemppi products can significantly increase the productivity of your welding and provide years of economical service.

This operating manual contains important information on the use, maintenance and safety of your Kemppi product. The technical specifications of the equipment can be found at the end of the manual.

Please read the manual carefully before using the equipment for the first time. For your own safety and that of your working environment, pay particular attention to the safety instructions in the manual.

For more information on Kemppi products, contact Kemppi Oy, consult an authorised Kemppi dealer, or visit the Kemppi web site at www.kemppi.com.

The specifications presented in this manual are subject to change without prior notice.

Important notes

Items in the manual that require particular attention in order to minimise damage and personal harm are indicated with the ***'NOTE!'*** notation. Read these sections carefully and follow their instructions.

Disclaimer

While every effort has been made to ensure that the information contained in this guide is accurate and complete, no liability can be accepted for any errors or omissions. Kemppi reserves the right to change the specification of the product described at any time without prior notice. Do not copy, record, reproduce or transmit the contents of this guide without prior permission from Kemppi.

1.2 Product introduction

MasterTig LT 250 is a high quality DC TIG and MMA welding source for industrial applications. MasterTig LT 250 requires no mains input voltage supply and is powered from the supply voltage provided by a parent power source. See item 2.3.

Before using or doing any maintenance work on the machine, read the operating manual and keep it for further reference.

2. BEFORE YOU START USING THE UNIT

NOTE! *Please read the separate safety instruction booklet provided before you commence welding. Pay particular attention to the risks associated with fire and explosion.*

2.1 Unpacking

Always before using the equipment, make sure it was not damaged during transportation. Also check that you have received what you ordered and that there are instructions for it.

The packaging material of the products is suitable for recycling.

Transportation

The machine should be transported in an upright position.

NOTE! *Always move the welding machine by lifting it from the handle. Never pull it from the welding torch or other cables.*

Environment

The machine is suitable for both indoor and outdoor use, but it should be protected from rain and sunshine. Store the machine in a dry and clean environment and protect it from sand and dust during use and storage. The recommended operating temperature range is -20 °C – +40 °C. Place the machine in such a way that it does not come in contact with hot surfaces, sparks and spatters. Make sure the air flow in the machine is unrestricted.

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2.2 Positioning and location of the machine

Place the machine on a firm, dry and level surface. Where possible, do not allow dust or other impurities to enter the machines cooling air flow. Preferably site the machine above floor level; for example on a suitable carriage unit.

Notes for positioning the machine

- The surface inclination should not exceed 15 degrees.
- Ensure the free circulation of the cooling air. There must be at least 20 cm of free space in front of and behind the machine for cooling air to circulate.
- Protect the machine against heavy rain and direct sunshine.

NOTE! *The machine should not be operated in the rain as the protection class of the machine, IP23S, allows for outside preserving and storage only.*

NOTE! *Never use a wet welding machine.*

NOTE! *Never aim metallic grinding spray/sparks towards the equipment.*

2.3 Power supply connection

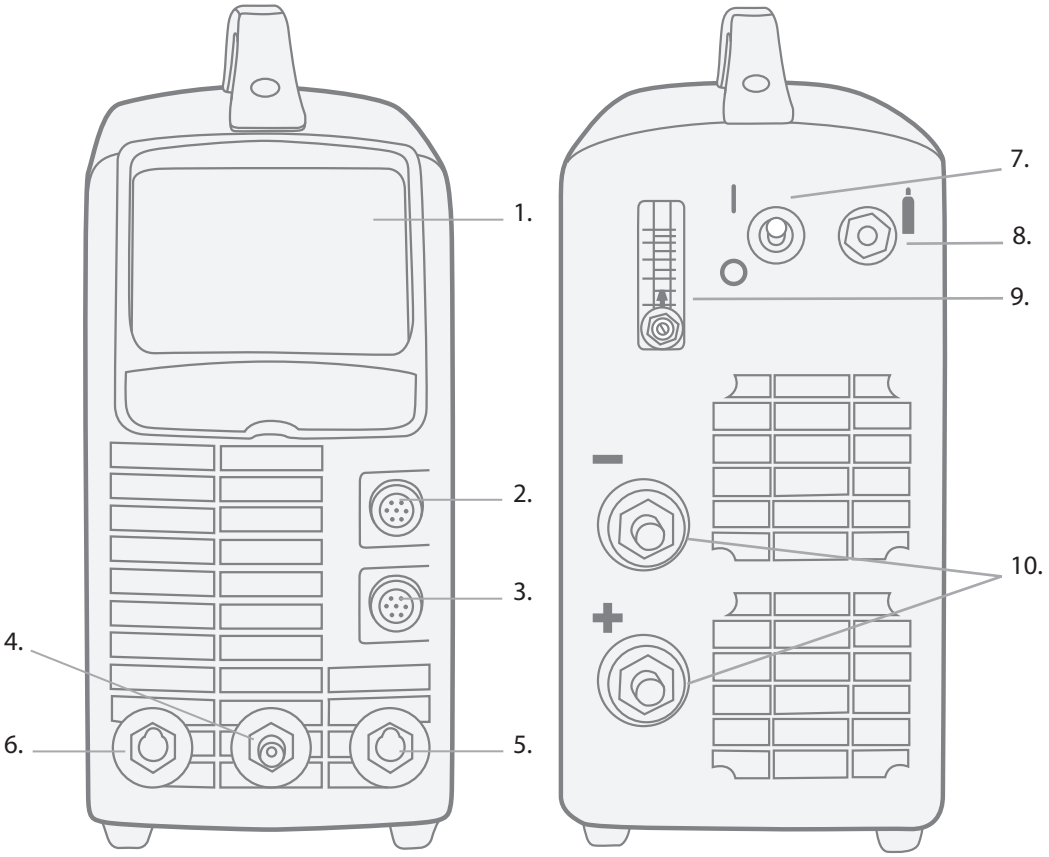
MasterTig LT 250 requires no mains input voltage supply and is powered by the supply output voltage from a parent welding power source. You can use either a Constant Current (CC) or Constant Voltage (CV) parent power source normally used for MMA or MIG/MAG welding, or a welding generator with a suitable output characteristic.

NOTE! *The performance of the parent power source can limit the maximum output of MasterTig LT 250.*

2.4 Serial number

Serial number of the machine is marked on the rating plate. The serial number is the only proper means of identifying parts for a specific product. It is important to make correct reference to the serial number of the product when making repairs or ordering spare parts.

2.5 General view of the machine



Front of machine

1. Control panel
2. Remote control connector
3. TIG torch control connector
4. Shield gas and current connector for TIG torch
5. (+) connector for electrode holder
6. (–) connector for earth cable

Markings for (+/–) poles on the machine front are embossed.

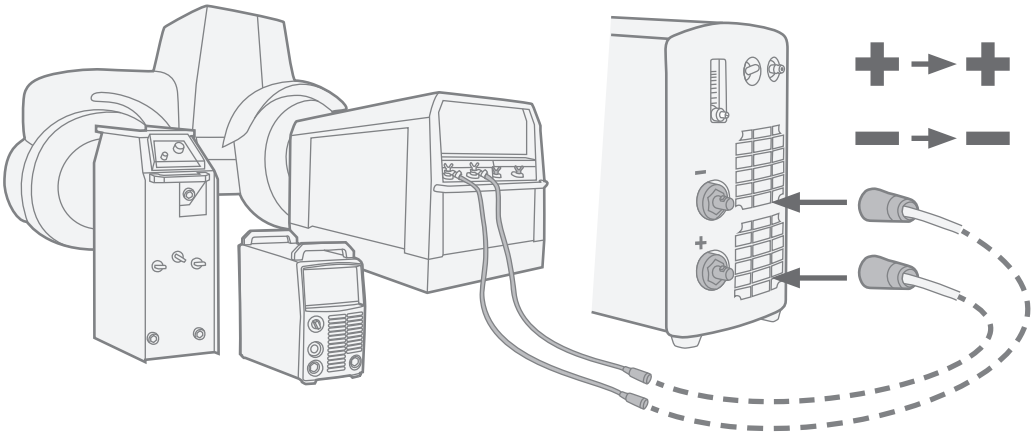
Rear of machine

7. ON/OFF switch
8. Snap connector for gas
9. Shielding gas flow meter
10. Welding cables connectors from parent source

NOTE! *MasterTig LT 250 is polarity protected. If the +/- power cables are connected in reverse the machine will not function. This is evident by no power to the control panel.*

2.6 Welding cable connections

Connect parent power source



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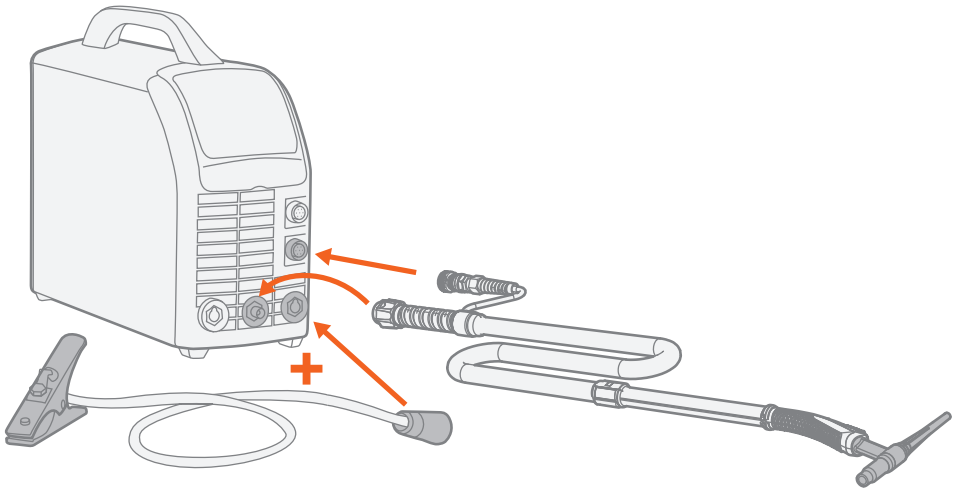
NOTE! *LT 250 may be powered from a variety of parent welding power supply sources, providing the output voltage is 40 – 100 volts DC. Inadequate supply voltage will result in limited performance or failure to operate. Always connect both plus and minus welding cables from parent power source to LT 250 to avoid risk of malfunctioning or hazard.*

Connect TIG torch



The welding torch is used to supply shielding gas and electrical arc energy to the weld piece. When you press the welding torch switch, the shielding gas begins to flow and the arc is established. The TIG torch is connected as shown.

Earth return cable

Connect the earth return cable to the positive pole in TIG welding and to the negative pole in MMA welding.

Before you start welding, clean the work piece surface and fix the earth return clamp to the work piece in order to create a closed and interference free welding circuit.

3. USE

NOTE! *Welding fumes may be dangerous to your health. Ensure that there is ample ventilation during welding! Never look at the arc without a face shield specifically designed for arc welding! Protect yourself and your surrounding area from the arc and hot welding spatter!*

Prepare to weld

NOTE! *Always wear protective clothing, gloves, face and eye shields suitable for welding. It is recommended that you make practice welds before you commence welding your main work piece. If when igniting the arc or during welding, the electrode stick's or freezes' to the work piece, note that it will quickly heat up, and may start to glow red hot. To release the electrode, twist the electrode holder away from the work piece and start again. If this fails, switch off the machine at the main switch and then release the electrode after it has cooled down.*

NOTE! *The electrode and work piece will be very hot. Protect yourself and others at all times.*

You can start welding after you have made the necessary preparation described throughout these instructions.

3.1 TIG welding

TIG welding electrodes and gas nozzles

In DC TIG welding we recommend the use of the WC20 (grey) type electrode, however other types are available.

The welding electrode size (diameter) is selected depending on the welding current/power to be used. An electrode with an insufficient diameter compared to the welding current will melt, while excessive electrode size will make it more difficult to ignite the arc.

Generally speaking, a 1.6 mm tungsten electrode will cover currents up to 150 A, and 2.4 mm tungsten electrode up to 250 A DC current.

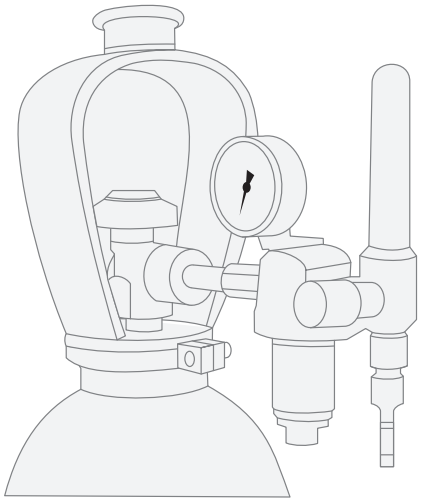
Before use, grind the tungsten electrode to a sharp point at approximately 1.5 times the diameter of the electrode. If the electrode touches the work piece during welding, re-sharpen the electrode.

3.2 Shielding gas

In TIG welding, shielding gas is used to prevent atmospheric contamination of the molten weld pool. Normally, the shielding gas is argon (Ar), and the gas flow rate is approximately 8 – 12 litres per minute, but this can vary according to the welding current used and the size of gas nozzle.

The machine is delivered with a 4.5 m long shielding gas hose. Connect the supplied female snap connector of the shielding gas hose to the machine's male hose connector, max. connection pressure 500 kPa (5 bar). Connect the free end of the shielding gas hose to the gas bottle, via a suitable and approved single stage regulator valve, where outlet flow rates can be adjusted.

NOTE! *Never attempt to connect directly to a compressed gas cylinder. Always use an approved and tested regulator and flow meter.*



Connecting the gas hose to a typical welding regulator control valve

1. Connect the supplied shielding gas hose to machine and via a suitable coupling to the gas regulator control valve outlet and tighten the connector.
2. Open the valve of the bottle.
3. Measure the flow.
4. Adjust the flow by the knob (8 – 12 l/min).

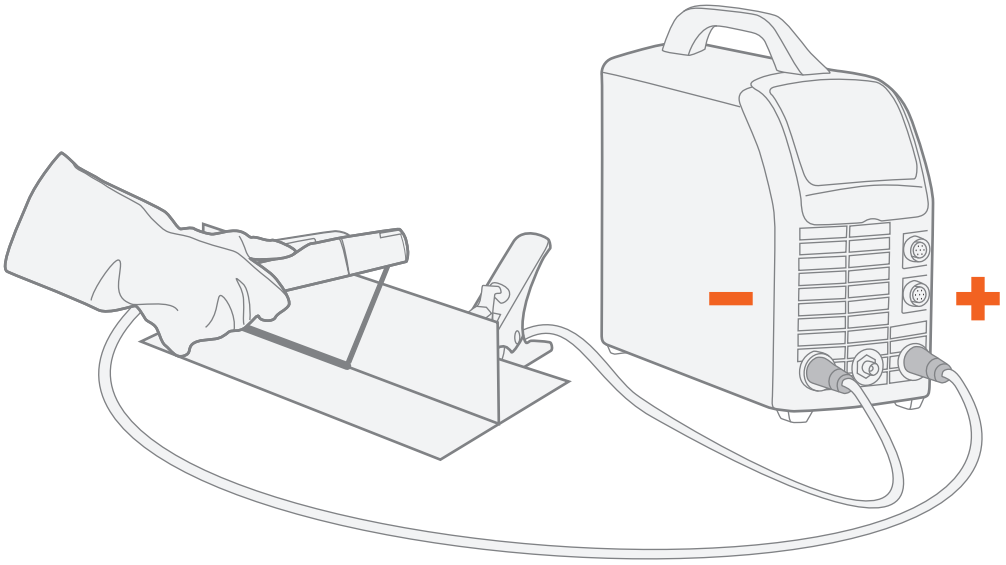
NOTE! *Use a suitable shielding gas for the welding application. Always secure the gas cylinder in an upright position with either a specially made wall rack or cylinder trolley. Always close the cylinder valve after welding.*

3.3 Connection for MMA welding

Electrode holder and earth clamp

In MMA welding, the welding electrodes must be connected to the correct pole. Normally, the electrode holder is connected to the positive and the earthing cable to the negative connector.

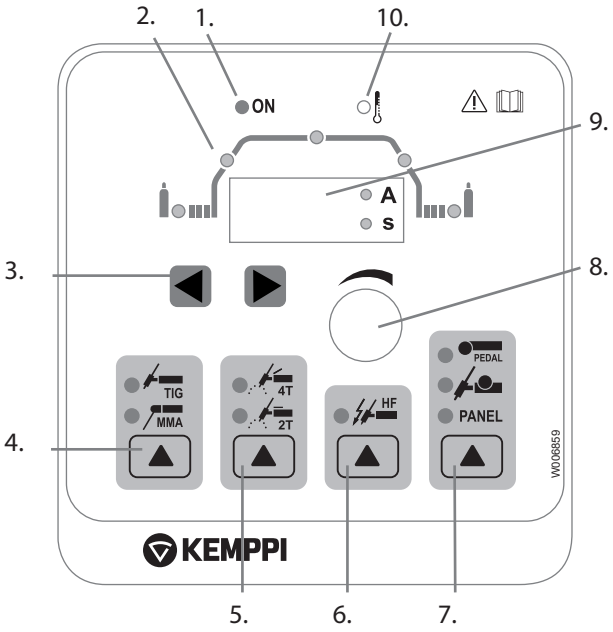
It is also important to properly adjust the welding current so that the filler material and coating will melt properly and the welding is efficient. The table below presents the electrode sizes available for use with the MasterTig LT 250 welding machine and the corresponding welding current values.



MMA Electrodes and corresponding current settings range

Electrode diameter	1.6 mm	2.0 mm	2.5 mm	3.25 mm	4.0 mm	5.0 mm
Fe-Rutile	30 – 60 A	40 – 80 A	50 – 110 A	80 – 150 A	120 – 210	150 – 250 A
Fe-Basic	30 – 55 A	50 – 80 A	80 – 110 A	110 – 150 A	140 – 200	200 – 250 A

3.4 Operating functions



1. Machine 'ON' green light
2. Pre/Post gas, upslope/downslope and main current parameter indicator.
3. Welding parameter selector arrow keys.
4. Welding process selection button (MMA or TIG).
5. 2T or 4T TIG torch switch selection button. Select 2T for short welds or 4T for long welds.
6. Ignition method selection button.
7. Current adjustment selector: panel control, TIG Torch remote or foot pedal or hand remote.
8. Welding current and parameter value control knob.
9. Welding current and parameter value display: time and amperes.
10. Overheating indicator.

Switching the machine on

When you power on the machine, the green standby indicator and panel are lit. Make sure that there is enough space around the machine to allow the air to freely circulate and flow into and out off the machine. If the supply cables at the back of the LT 250 are connected in reverse order the machine will not work and the panel will not illuminate.

3.4.1 Welding current regulation and remote control

The welding current can be adjusted steplessly with the control knob, if panel adjustment (PANEL) is selected.

If you want to adjust the welding current with the remote control, connect the remote control to the machine and then select remote control with selector (7). The following remote control options are available: RTC10, RTC20, R10 and R11F. The remote foot pedal R11F can only be used with TIG welding in 2T operation mode.

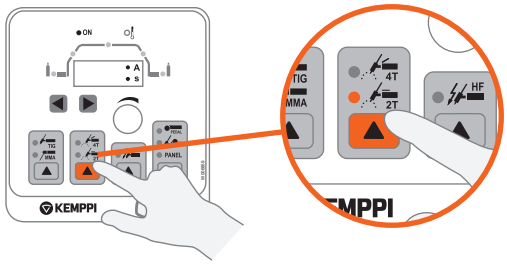
3.4.2 MMA welding settings

MMA welding is selected when the indicator next to the MMA symbol is lit. If needed, press the process selection button to select the MMA process (4). The machine automatically sets suitable values to the ignition time, ignition pulse and arc dynamics.

3.4.3 TIG welding function

Select the TIG welding process by pressing the MMA/TIG button.

Torch switch control in 2T mode and HF arc ignition



The shielding gas starts to flow when the torch switch is pressed and the welding arc is established automatically via HF ignition. The current starts to rise (if an upslope time is established) to the set welding current level. When you release the switch, the current starts to decrease. After the specified downslope time, the arc is disconnected and the set post-gas time begins.

Torch switch control in 4T mode and HF arc ignition

The shielding gas starts to flow when the torch switch is pressed. When the switch is released, the arc is automatically established via HF ignition. The current starts to rise (if an upslope time is established) to the set welding current level. When ready to end the welding cycle, press and release the torch switch again. The welding current starts to drop (if a downslope time is established) until the arc is extinguished and the set post-gas time begins.

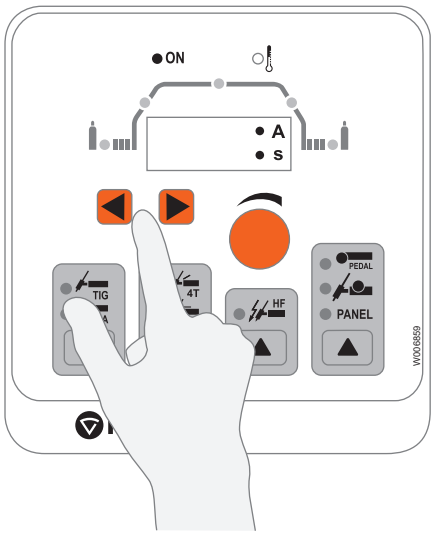
HF or Contact ignition

The TIG arc can be established with or without an HF pulse.

If the HF indicator is not lit, the arc can be established by lightly contacting the tungsten electrode to the work piece. Press the torch trigger and then quickly lift the contact of the tungsten electrode from the work piece (2T function); the arc is established simultaneously and effectively.

For HF ignition, press the HF button so that the indicator is on (item 6). Press the TIG torch trigger and hold or release, depending on whether 2T or 4T is selected. The shielding gas flows and the HF (High Frequency arc) ignites the welding arc.

Setting parameters



Select the welding parameters with the arrow keys (3) and adjust the parameter values with the control knob (8). When setting the parameters, the display (9) will show the parameter being adjusted as well as the numeric value that will be set for it. After three seconds, the display returns to normal state and shows the welding current value.

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4. SETUP FEATURES

Configuring additional features

The machine has additional features that can be selected and adjusted with the SETUP feature. To activate and deactivate it, press both arrow buttons (3) simultaneously for at least 5 seconds.

In the SETUP mode, the display will show the name of the parameter to be adjusted and its numerical value. Select the parameter to be adjusted with the arrow buttons and change the parameter value with the control knob. The following parameters and values are available:

Name displayed	Parameter values	Factory setting	Description
A	1/0	0	End current level selection, 1 = I min. / 0 = 15 %
C	1/0	0	Forced stop during downslope with a brief pressing of the switch, 1 = On / 0 = Off
d	0/5	0	0 =Standard 4T switching logic / 5 = PROTIG TL switching logic
E	5 % – 40 %	20 %	Upslope start current level selection (% of the welding current)
F	1/0	0	Restore factory settings *), 1 = Restore / 0 = No restore
h	0.0 – 2.0 s	0	Minimum setting for pre-gas time
J	0 – 10 s	1 s	Minumum setting for post-gas time
L	5 – 20 s	10 s	Maximum setting for pre-gas time
o	15 – 99 s	30 s	Maximum setting for post-gas time
S	-3...5	0	Arc dynamics (Arc Force)
t	-9...0	0	Electrode ignition pulse (-9 = No pulse / 0 = Max pulse)
U	1/0	0	Disable automatic remote control recognition. 0 = Enable automatic recognition, 1 = Disable automatic recognition.

*) Happens when exiting SETUP mode and value is 1.

5. ERROR CODES

The machine always checks its operation automatically during start-up and reports any failures detected. If failures are detected during start-up, they are shown as error codes on the control panel display.

Error 4: Power source overheating

The power source has overheated. The cause may be one of the following:

- The power source has been used for a long time at maximum power.
- The circulation of cooling air to the power source is blocked.
- The cooling system has experienced a failure.

Remove any obstacle to air circulation, and wait until the power source fan has cooled down the machine.

Other error codes:

The machine can show codes not listed here. In the event of an unlisted code appearing, contact an authorised Kemppi service agent and report the error code shown.

5.1 Troubleshooting

Problem	Cause
Panel display does not light.	• Check parent power supply is functioning • Check parent power supply is connected • Check parent power supply cable connectors are correct and secure.
Poor welding results.	Several factors affect the welding quality. • Ensure that the parent power source is set to full power and that the voltage exceeds the minimum supply voltage level of 40 volts. (Inadequate supply voltage will result in an unstable power delivery or poor ignition). • Ensure that the welding current selected is adequate for the selected electrode type and size. • Ensure the cable connections are correct and secure. • Ensure the process selection is correct. • Check that the earth return clamp connection area is clean and that the cable and clamp are not damaged. • For TIG welding, check that the shielding gas flow is switched on and set correctly. Poor ignition and arc quality in TIG welding may be a result of a poorly prepared tungsten electrode. Always maintain and grind a point on the TIG torch electrode tip before welding.
Overheating indicator is illuminated.	Normally, this indicates that the device has reached its maximum designed operating temperature. The thermostat has become active, switching the welding power off. Allow the unit to cool and the machine will soon automatically reset and allow welding to re-start. • Ensure that cooling air has unrestricted flow. • If the machine's duty cycle has been exceeded, wait for indicator to turn off. In certain circumstances, this light may also indicate irregularity in the supply voltage. Too low or high supply voltage.

If the machine's malfunction is not eliminated with the above measures, contact Kemppi service.

6. MAINTENANCE

All electromechanical devices require routine service maintenance depending on usage. This type of routine maintenance will prevent hazards and malfunctions.

We recommend that you schedule a service inspection of your welding machine every six months. An authorised Kemppi service agent will inspect and clean your machine, ensuring that all power connections are tight and secure. Power connections can become loose and oxidised with frequent and high changes in temperature.

NOTE! *Disconnect the machine from the power supply before handling electric cables.*

NOTE! *Be careful when handling electric cables!*

In maintaining the unit, take into consideration the rate of use and the environment it is used in. When the unit is used properly and serviced regularly, you will avoid unnecessary disturbances in use and production.

6.1 Daily maintenance

Perform the following maintenance daily:

- Clean electrode holder and TIG torch's gas nozzle. Replace damaged or worn parts.
- Check TIG torch's electrode. Replace or sharpen, if necessary.
- Check tightness of welding and earth cables connections.
- Check the condition of the parent and welding supply cables and replace damaged cables.
- See that there is enough space around the unit for ventilation.

6.2 Storage

Store the unit in a clean and dry place. Shield it from rain, and in temperatures exceeding +25 °C from direct exposure to sun.

6.3 Disposal of the machine

Do not dispose of electrical equipment with normal waste!

In observance of European Directive 2002/96/EC on waste electrical and electronic equipment, and its implementation in accordance with national law, electrical equipment that has reached the end of its life must be collected separately and taken to an appropriate environmentally responsible recycling facility.

The owner of the equipment is obliged to deliver a decommissioned unit to a regional collection centre, per the instructions of local authorities or a Kemppi representative. By applying this European Directive you will improve the environment and human health.

7. ORDERING NUMBERS

Product	Part number
Mastertig LT 250	6115100
Cables	
Welding cable, 35 mm^2 5 m	6184301
Welding cable, 35 mm^2 10 m	6184302
Earth return cable, 35 mm^2 5 m	6184311
Earth return cable, 35 mm^2 10 m	6184312
Extension cable, 35 mm^2 5 m	6183305
Extension cable, 35 mm^2 10 m	6183310
Ancillary devices	
TIG welding torch controls	
RTC 10	6185477
RTC 20	6185478
Gas flow gauge AR/clock	6265136
Shielding gas hose (4.5 m)	W001077
Carrying strap	9592160
Remote control units	
R 10, length 5 m	6185409
R 10, length 10 m	618540901
R11F	6185407

8. TECHNICAL DATA

MasterTig LT 250		
Connection voltage range	DC	40 V – 100 V
Rated input power		8.6 kW/9.1 kVA
Supply current, I_{1max}	TIG	155 A
	MMA	230 A
Supply current, I_{1eff}	TIG	90 A
	MMA	135 A
Connection cable		35 mm^2
Output 40 °C	TIG	35 % ED 250 A/20 V
	TIG	60 % ED 200 A/18 V
	TIG	100 % ED 160 A/16.4 V
	MMA	35 % ED 250 A/30 V
	MMA	60 % ED 200 A/28 V
	MMA	100 % ED 160 A/26.4 V
Welding range	TIG	5 A/1 V – 250 A/35 V
	MMA	10 A/1 V – 250 A/35 V
Open circuit voltage		90 V
Idle power	TIG	8 W
	MMA	21 W
Efficiency at 100 % ED	TIG	80 %
	MMA	86 %
Arc striking voltage		10 kV
MMA welding electrodes		1.6 – 5.0 mm
External dimensions (L × W × H)		460 × 180 × 390 mm
Weight		12.6 kg
Temperature class		F
Degree of protection		IP23S
EMC class		A
Operating temperature range		–20 °C . . . +40 °C
Storage temperature range		–40 °C . . . +60 °C
Standards **IEC 60974-1:2012** **IEC 60974-10:2007** **IEC 60974-3:2007**		

For connection options of all gun and torch models and corresponding remote controls, refer to Kemppi Userdoc at https://kemp.cc/connectivity.

www.kemppi.com

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